1-13-2014

2013 Secretive Marshbird Survey of Nebraska's Eastern Saline Wetlands

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13 January 2014

Nebraska's eastern saline wetlands (ESW) harbor a unique community of organisms and are considered critically endangered (LaGrange 2007). The ESW ecological community type is one of the rarest and most imperiled in the state (Clausen et al. 1989). ESW occur in floodplain swales and depressions within the Salt and Rock Creek watersheds in Lancaster and southern Saunders counties. ESW are temporarily and seasonally flooded palustrine wetlands (Gersib and Steinauer 1991, Gilbert et al. 1994). These wetlands are characterized by saline mineral soils and salt-tolerant vegetation (LaGrange et al. 2003). Their salinity originates from groundwater passing through an underlying rock formation containing salts deposited by an ancient sea that once covered Nebraska (LaGrange 2007).

Nebraska's ESW have been converted and degraded through commercial, residential, and agricultural development (Gersib and Steinauer 1991). ESW were estimated to once total approximately 20,000 acres; approximately 4,000 acres remain today (LaGrange et al. 2003). The remaining saline wetlands are a high conservation priority because they provide habitat for a diversity of plant and wildlife species, including the state and federally endangered Salt Creek Tiger Beetle (*Cicindela nevadica lincolniana*) and state endangered Saltwort (*Salicornia rubra*; LaGrange et al. 2003).

Nebraska's ESW also provide important nesting and migratory habitat for a number of bird species, including several species with limited distributions in Nebraska (Ducey 1987). These wetlands provide stopover habitat for shorebirds and waterfowl during migration (Poague and Dinan 1997). The wetlands also provide habitat for a small number of rare to uncommon marsh denizens, several of which are secretive and not easily detected. The status of these species, particularly breeding status, is poorly understood not only in the ESW complex, but throughout Nebraska. The suite of marsh denizen species includes the Virginia Rail (*Rallus limicola*), King Rail (*Rallus elegans*), Black Rail (*Laterallus jamaicensis*), Sora (*Porzana carolina*), American Bittern (*Botaurus lentiginosus*), Least Bittern (*Ixobrychus exilis*) and Common Moorhen (*Gallinula galeata*). These species, along with Pied-billed Grebe (*Podilymbus podiceps*) and American Coot (*Fulica americana*), are collectively referred to as marshbirds throughout this report.

The purpose of this report is to summarize a pilot marshbird survey in the ESW. The intent of this project is to establish long-term marshbird monitoring in Nebraska's ESW to understand the abundance, site use, and breeding status of marshbirds in this ESW complex. Information from this monitoring program will be useful in evaluating management actions and developing future conservation strategies for Nebraska's ESW. Our primary objectives in 2013 were to develop our survey methods, select and become familiar with our survey sites, and collect baseline data. Here, we present the preliminary results of the 2013 pilot survey.

METHODS

Study Area and Site Selection

We surveyed marshbirds in Nebraska's ESW complex in northern Lancaster and extreme southern Saunders counties (Figure 1). We used the National Wetland Inventory (NWI; U.S. Fish and Wildlife Service 2012) and aerial imagery to identify individual wetlands. NWI data were modified by the Rainwater Basin Joint Venture based on ground-thruthing (Ted LaGrange, personal communication). We imported these data into ArcGIS (version 10.1). We identified 15 public sites in our study area (Figure 1). Based on field observations and time constraints, we selected 11 public sites to survey. Three of these sites shared boundaries and were merged into one survey site. This process reduced the number of survey sites to nine (Table 1, Figure 2). We developed maps for each survey site.

We used the modified NWI data and field observations to select individual wetlands within survey sites. We selected Palustrine (P) and Lacustrine (L) wetlands classified as Aquatic Bed (AB), Emergent (EM), and Unconsolidated Bottom (UB) with Seasonally Flooded (C), Seasonally Flooded/Saturated (E), Semipermanently Flooded (F), Intermittently Exposed (G), and Permanently Flooded (H) water regimes. In 2013, we selected wetlands and survey points during our initial visit to each site based on visual observations and site maps (Figure 3). In future years we will modify our methods and use a probabilistic sampling approach to select wetlands and survey points.

Marshbird Surveys

We used methods outlined by Conway (2011) and modified by Harms and Dinsmore (2012, 2013). We conducted surveys during two survey periods, 15 April to 31 May and 1 June to 16 July. We originally planned to conduct surveys at each site once during each survey period. However, we limited our surveys during the early period because this period occurs during the migratory period for several focal species. We were also constrained by available time. We conducted the remaining surveys during the later period (1 June to 16 July), when each site was surveyed once. Surveys were conducted either in the morning, 30 minutes before sunrise to two hours after sunrise, or in the evening, two hours before sunset to 30 minutes after sunset. We surveyed nine species: Virginia Rail, King Rail, Black Rain, Sora, American Bittern, Least Bittern, Common Moorhen, Pied-billed Grebe, and American Coot (Table 2).

We evaluated sites, identified survey points, developed survey routes, and conducted call-broadcast surveys during initial site visits. We defined a survey route as a group of survey points that were surveyed together by the same surveyor on the same day and during the same time period (morning or evening). At each survey point we recorded location using a handheld Global Positioning System (GPS). We recorded the general location description for each survey point using the 11 location types outlined in the standardized North American marshbird monitoring protocol (Appendix A; Conway 2011). If the point was along a road we recorded the road type (gravel, dirt, paved, Highway, etc.). At each survey point we also recorded the level of background noise, ambient temperature, wind speed, sky condition, and water conditions (Appendix A). Most survey points were spaced at least 400 m apart to avoid disturbing birds at nearby points during the call-broadcast (Conway 2011). A few of our points were closer than 400 m, but none were less than 200 m.

We conducted a 13-minute point-count with call-broadcast at each survey point. Our call broadcast sequence was provided by the North American Marsh Bird Monitoring Program coordinator (Conway 2011). The broadcast calls included eight of the nine focal species. We did not include American Coot in our broadcast sequence because they are often observed visually and do not frequently respond to calls (Harms and Dinsmore, unpublished). We used a game caller with speakers (Western Rivers digital game caller) to broadcast calls. The survey sequence consisted of a five-minute period of silence, followed by 30 seconds of calls and 30 seconds of silence for each focal species, excluding American Coot (Table 3). The five-minute period of silence was divided into one-minute intervals. We recorded all focal species detected (visual and aural) during each one-minute interval throughout the entire 13-minute survey sequence. We used a laser rangefinder to measure the distance to each bird(s) detected. If the same individual bird was detected several times during the first one-minute interval we only recorded that bird once on the datasheet in the first one-minute interval column. If the same bird was detected again during the second one-minute interval we recorded that bird's presence again in the second one-minute interval column. We recorded "1" if the individual was detected aurally, "s" if the individual was detected visually, and "1s" if the individual was detected aurally and visually. We recorded all data on data sheets obtained from the North American Marsh Bird Monitoring website (http://cals.arizona.edu/research/azfwru/NationalMarshBird/). Surveys were not conducted during periods of sustained rain, heavy fog, or when wind speed was greater than 12 mph as recommended by Conway (2011).

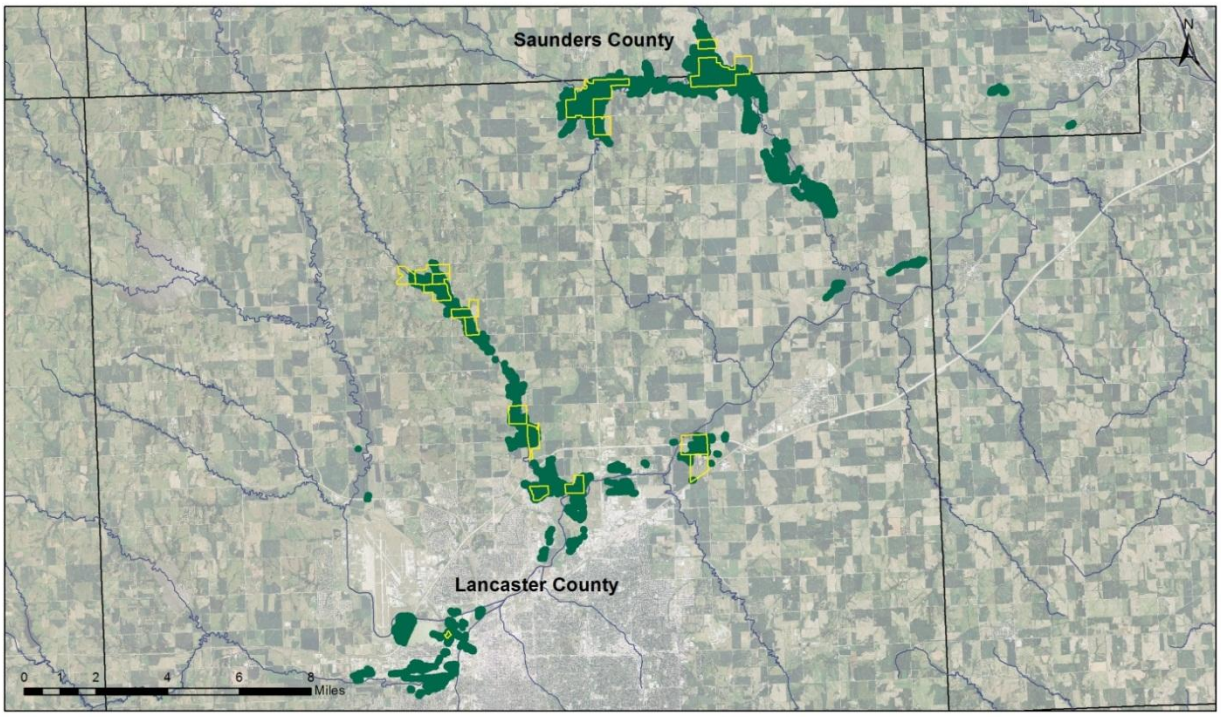

Figure 1. Nebraska's eastern saline wetlands (areas in green) in Lancaster and Saunders County. The yellow polygons outline the the 15 public sites in our study area.

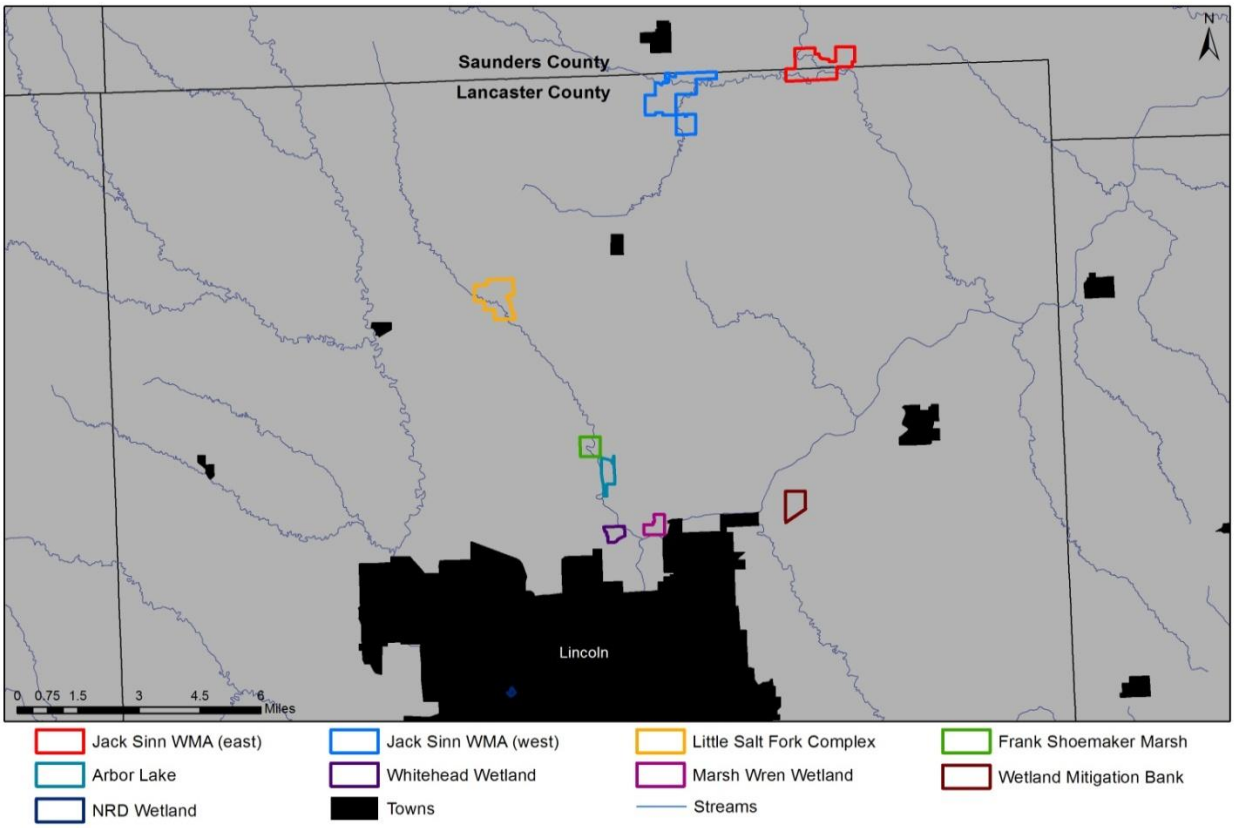

Figure 2. Survey sites for marshbird monitoring surveys.

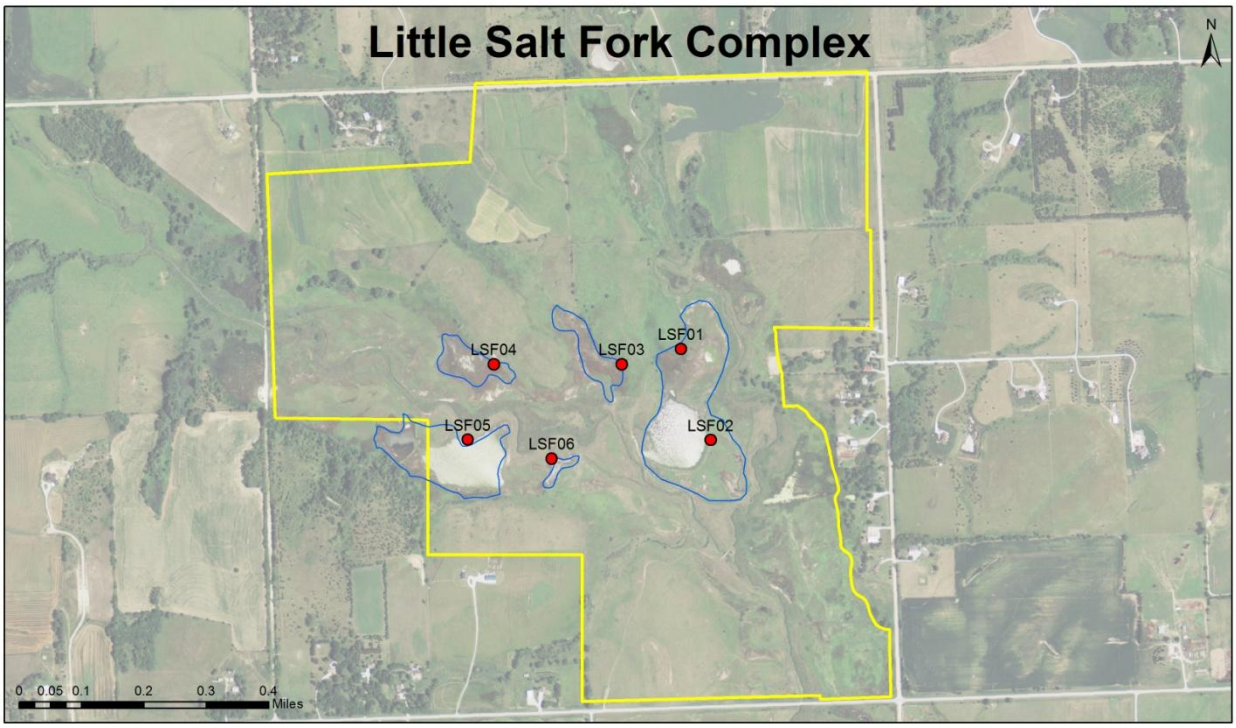

Figure 3. Example of a survey site (yellow outline) with wetlands (blue outline) and survey points (red dots).

Table 1. List of survey sites in our study area. Sites in blue text were surveyed together as one survey site named "Little Salt Fork Complex".

Survey Route	Property Owner	Acres	# of Survey Points
Jack Sinn WMA (east)	Nebraska Game and Parks Commission	618.9	7
Jack Sinn WMA (west)	Nebraska Game and Parks Commission	736.4	4
Little Salt Creek West WMA	*Nebraska Game and Parks Commission*	*214.9*	*1*
Alten Parcel	*Lower Platte South NRD*	*73.7*	*2*
Little Salt Fork Marsh Preserve	*The Nature Conservancy of Nebraska*	*162.9*	*3*
Frank Shoemaker Marsh	City of Lincoln	155.9	1
Arbor Lake	City of Lincoln	136.0	1
Whitehead Wetland	Lower Platte South NRD	98.2	2
Marsh Wren Wetland	Lower Platte South NRD	123.6	1
Wetland Mitigation Bank	City of Lincoln/Lancaster County	192.1	1
NRD Wetland	Lower Platte South NRD	11.3	1

Table 2. List of nine focal species.

Acronym	Common Name	Scientific Name
VIRA	Virginia Rail	*Rallus limicola*
KIRA	King Rail	*Rallus elegans*
BLRA	Black Rail	*Laterallus jamaicensis*
SORA	Sora	*Porzana carolina*
AMBI	American Bittern	*Botaurus lentiginosus*
LEBI	Least Bittern	*Ixobrychus exilis*
COMO	Common Moorhen	*Gallinula galeata*
PBGR	Pied-billed Grebe	*Podilymbus podiceps*
AMCO	American Coot	*Fulica americana*

Table 3. Survey sequence for each survey point.

Time	Activity Description
5:00	5 minute point count in silence (verbal statement at each minute)
6:00	30 seconds Black Rail calls, 30 seconds silence
7:00	30 seconds Least Bittern calls, 30 seconds silence
8:00	30 seconds Sora calls, 30 seconds silence
9:00	30 seconds Virginia Rail calls , 30 seconds silence
10:00	30 seconds King Rail calls, 30 seconds silence
11:00	30 seconds American Bittern calls, 30 seconds silence
12:00	30 seconds Common Moorhen calls, 30 seconds silence
13:00	30 seconds Pied-billed Grebe calls, 30 seconds silence (verbal statement "stop")
Total Time = 13 minutes	

RESULTS

We surveyed 24 points at 17 wetlands within the nine survey sites. We detected five focal species and 46 individual birds (Table 4). Most detections (83%) occurred during two surveys conducted in the first survey period (May). Four species and 38 birds were detected during the first survey period, and three species and eight birds were detected during the second survey period. We detected Virginia Rail, Sora, American Bittern, Pied-billed Grebe, and American Coot. We did not detect Black Rail, King Rail, Least Bittern, or Common Moorhen. American Coot was the most frequently detected species comprising 70% of all detections. Virginia Rail was the second most frequently detected species comprising 13% of all detections. Most detections were visual (80%) but this differed by species. All detections of Pied-billed Grebe, American Coot, and American Bittern were visual and all detections of Virginia Rail and Sora were aural.

Table 4. Number of focal species detected at each site during each survey period.

Site Name	Date	VIRA	SORA	AMBI	PBGR	AMCO	Total
FIRST SURVEY PERIOD (15 April - 31 May)							
Jack Sinn East	05/06/13	4	3	1	0	25	33
Little Salt Fork Complex	05/07/13	1	0	0	0	4	5
SECOND SURVEY PERIOD (1 June - 16 July)							
Little Salt Fork Complex	07/02/13	1	0	0	0	0	1
Whitehead Marsh	07/03/13	0	0	0	2	1	3
Arbor Lake	07/03/13	0	0	0	0	0	0
Shoemaker Marsh	07/03/13	0	0	0	0	0	0
Jack Sinn East	07/10/13	0	0	0	2	0	2
Jack Sinn West	07/11/13	0	0	0	0	1	1
Wetland Mitigation Bank	07/16/13	0	0	0	0	1	1
Marsh Wren	07/16/13	0	0	0	0	0	0
NRD Wetland	07/16/13	0	0	0	0	0	0
TOTAL		**6**	**3**	**1**	**4**	**32**	**46**

DISCUSSION

Our 2013 marshbird pilot survey of ESW serves as a useful springboard for developing future surveys in the ESW complex and throughout Nebraska. Our ability to make inferences about marshbird breeding status in the ESW is limited because of our sampling approach. Furthermore, we were unable to conduct analyses (e.g., occupancy, Distance Sampling) because we had very few detections. Nevertheless, we were surprised by the apparent absence of several focal species during the late survey period. These results suggest that the focal species may not currently use Nebraska's ESW as breeding sites. A similar study completed in the ESW in 2003 showed similar results (NGPC unpublished data). However, there were notable differences. In 2003, six American Bitterns were recorded compared to none in 2013. There was an increase in the number of Sora and American Coots in 2013 but most of these detections occurred in early May and were likely migrants. In 2003, there was also a confirmed breeding record of a Least Bittern, a species not detected in 2013.

Even though breeding records for most species exist, it is unclear whether any of these species were ever regular breeders in the ESW complex. It is possible that all focal species that have bred in the ESW have occurred irregularly. However, nearly 90% of ESW have been lost or are degraded (LaGrange et al. 2003) and it is possible these species have been extirpated as regular breeders. Regardless, future iterations of this survey should indicate whether any of the focal species currently breed in the ESW complex.

We used NWI data to identify wetlands and it was our assumption that NWI data would be useful to stratify wetlands by size or other characters. However, we found NWI data to be inconsistent with the location and extent of some wetlands. The inconsistencies could not be explained by yearly or seasonal variation in wetlands due to hydrology. An important challenge of future surveys is modifying the NWI data to make it usable or developing a different data set that can be used to stratify wetlands.

Marshbird point survey at Point LSF04 (see Figure 3) at Little Salt Fork Complex, 2 July 2013

ACKNOWLEDGEMENTS

We thank Tom Malmstrom, Chris Helzer, Terry Genrich, Kirk Hansen, Karie Decker, Ted LaGrange, Charles Lesiak, and Heather Modrow for providing comments on the study proposal. We thank Meagan Conway and Courtney Conway for providing the call-broadcast sequence. We thank Carey Grell for providing data from marshbird surveys completed in 2003. We also appreciate discussions with Stephen J. Dinsmore regarding our methods and survey timing. All photographs by Joel Jorgensen.

LITERATURE CITED

Clausen, M., M. Fritz, and G. Steinauer. 1989. The Nebraska Natural Heritage Program, two-year progress report. The Nebraska Natural Heritage Program, Lincoln, NE.

Conway, C.J. 2011. Standardized North American marsh bird monitoring protocol. Waterbirds 34: 319–346.

Ducey, J.E. 1987. Biological Features of Saline Wetlands in Lancaster County, Nebraska. *Transactions of the Nebraska Academy of Sciences,* 15: 5-14.

Gersib, R.A. and G. Steinauer. 1991. A biological inventory and general assessment of eastern Nebraska saline wetlands in Lancaster and southern Saunders Counties. *Transactions of the Nebraska Academy of Sciences,* 17: 37-44.

Gilbert, M.C., R.G. Stutheit, T. Hickman, E. Wilson, T. Taylor, L. Krueger, D. Gersib. 1994. Resource categorization of Nebraska's Eastern saline wetlands. Prepared for the Eastern Nebraska Saline Wetlands Interagency Study Project. U.S. Army Corps of Engineers, Omaha Dist. and Nebraska Game and Parks Commission.

Harms, T.M., and S.J. Dinsmore. 2013. Habitat associations of secretive marsh birds in Iowa. Wetlands 33: 561-571.

Harms, T.M., and S.J. Dinsmore. 2012. Density and abundance of secretive marsh birds in Iowa. Waterbirds 35: 208-216.

LaGrange, T. 2007. Guide to Nebraska's wetlands and their conservation needs. Nebraska Game and Parks Commission, Lincoln, NE.

LaGrange, T., T. Genrich, G. Johnson, D. Schulz, and B. Lathrop. 2003. Implementation plan for the conservation of Nebraska's eastern saline wetlands. Nebraska Game and Parks Commission, Lincoln, NE.

Poague, K., and J. Dinan. 1997. International survey report for southeastern Nebraska–spring 1997. Nebraska Bird Review 65: 127-131.

U.S. Fish and Wildlife Service. 2012. National Wetland Inventory. http://www.fws.gov/wetlands/,

APPENDIX A. Categories for recording location description, background noise, wind speed, sky condition, and water conditions outlined in the standardized North American marsh bird monitoring protocol (Conway 2011).

#	Location Description
1	along a ditch, dike or berm with emergent vegetation on both sides
2	along a ditch, dike or berm with emergent vegetation on only one side
3	along a public road (within 25m) with emergent vegetation on both sides
4	along a public road (within 25m) with emergent vegetation on only one side
5	along a grassland/emergent edge
6	along a scrub-shrub/emergent edge
7	along a forest/emergent edge
8	along an open water/emergent edge
9	within a narrow water channel or tidal creek with emergent vegetation on both sides
10	within a contiguous patch of emergent vegetation (also record distance from edge)
11	other (and provide description of point placement)
Background Noise	
0	No background noise during virtually entire 13-minute survey
1	Faint background noise during at least half of 13-minute survey
2	Moderate background noise during more than 30 seconds of 13-minute survey (probably cannot hear some birds beyond 100m)
3	Loud background noise during more than 30 seconds of 13-minute survey (probably cannot hear some birds beyond 50m)
4	Intense background noise during more than 30 seconds of 13-minute survey (probably cannot hear some birds beyond 25m)
9	Not recorded
Wind Speed (Beaufort Scale)	
0	smoke rises vertically
1	wind direction shown by smoke drift
2	wind felt on face; leaves rustle
3	leaves and small twigs in constant motion and light flag extended
4	raises dust and loose paper -- small branches are moved
5	small trees with leaves sway --crested wavelets on inland waters
Sky Conditions	
0	clear or a few clouds
1	partial cloud cover or variable sky
2	cloudy or overcast
4	fog or smoke
5	drizzle
6	snow
8	showers
Water Conditions	
0	Hydric soils (inundated)
1	Wet-mesic soils (saturated)
2	Mesic soils (moise)
3	Dry-mesic soils
4	Xeric soils (dry)